

Solar Wind Data and Telecommunications

NEEK-0000-5-00274

Task II: Coronal Mass Ejection Imagery

Task II Purpose

- To develop innovative concepts for meeting some or all of NOAA's requirements for CME Imagery
 - Main goal is to provide NOAA/SEC customers with the best possible forecasts of geomagnetic storms caused by CME's.
- We are interested in what new technical approaches might meet our requirements on any space platform.
- We are also interested in innovative solutions that could meet **some** or all of our requirements from the solar wind platform if that is a good value solution.
- Cost and mass are significant considerations.

CME Imaging Requirements

- Requirements derived from SOHO/LASCO
 - Used in SEC forecast center as if it were operational. Not designed to be operational, but ESA/NASA operations were sufficient to show the data could provide a significant advantage to forecasters.
- CME's in the corona ($4-17R_{\text{sun}}$)
 - Want to see at all potentially geoeffective CME's (Halo's and partial Halo's)
 - However, we are also interested in CME's off Sun-Earth line
 - SEP events
 - All clear forecasts.
 - Minimum $13R_{\text{sun}}$ FOV (from inner to outer radii)
 - 15 minute cadence allows sufficient observations of fastest CME's (2500 km/s)
 - We are primarily interested in 'terminal' velocity
 - We want to also determine direction, spatial extent, and mass (or relative brightness) and it's distribution.

CME Imaging Requirements

- Requirements derived from SMEI
 - Still unproven, but it wasn't designed to meet operational requirements. We can see the potential, however.
- CME's along Sun-Earth line ($15-215R_{\text{sun}}$)
 - Again, want to see all potentially geoeffective CME's
 - Interest in CME's off Sun-Earth line for all clear forecasts
 - No capabilities w/respect to SEP's are envisioned
 - In this case, we are interested in tracking CME's all the way to the Earth.
 - However, early detection is always desired
 - Fast CME's (19 hours Sun-Earth)
 - Longest possible lead time on forecasts (watches) to customers
 - We want to also determine direction, spatial extent, and mass (or relative brightness) and it's distribution.

GOES-R Formulation Phase

- **The coronagraph requirements in Attachment E2 are being studied in the GOES-R formulation phase.**
- **Pre-planned Product Improvement (P³I) status**
 - There is no money in the NOAA FY07 budget request that would implement a coronagraph on the GOES-R platform
- **GOES-R Coronagraph (E2) Requirements Evaluation (SOW)**
 - The Contractor **shall** perform a Requirements Evaluation on the SCOR.
 - The Contractor **shall** consider in the evaluation all requirements stated in the SCOR PORD, the SCOR UIID, the MAR and the GIRD and evaluate their impact on interface requirements including pointing, mass, volume, power, data rate, glint free field of view, and contamination requirements.
 - The Contractor **shall** evaluate all requirements and recommend which requirements are not practical due to mass, volume, data rate and power considerations, and provide alternatives to the requirements and/or constraints.
 - The Contractor **shall** present options that would allow the mounting of one or more of the SIS instrument on the same mounting panel as the SCOR. Any necessary changes to the concept designs of the SXI, EUVS, and XRS **shall** be identified.